

Editorials

Sustainable Management of Natural Resources in an Life-cycle Perspective

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The topic of this special issue is important for two reasons. The first is that, for LCA studies, it becomes increasingly clear that the stage of resource management, i.e. the extraction and processing of natural resources, is a crucial stage, because its impacts may well overshadow the impacts of all other stages. The second reason is that LCA is not the only approach to think and act in a life-cycle perspective. There are other analytical tools, such as substance flow analysis (SFA), and there are procedural approaches, such as certification of resource management with proximate labelling of the resources. These tools are organised in a different way, and often have a broader scope, also including the economic and social dimensions of sustainability.

These two reasons were the starting points for organising the very successful series of sessions in the SETAC World Conference in Portland (USA), November 2004, in co-operation with the UNEP/SETAC Life Cycle Initiative. These sessions enjoyed input from a broad spectrum of resource sectors and approaches, presented in about 90 papers and 40 posters. This Special Issue is inspired thereof. The majority of the articles in this issue originate from the LCA sessions of the Portland Conference, others come from outside.

The specific aim of this issue was, and is, to analyse the different approaches and to compare their results. So the reader may notice both a scientific approach, dealing with the methods used for the analysis of resource management, and a practical attempt, dealing with the effectiveness of the different approaches in practice: how about the organisation, what are the costs, which results are obtained, where are the bottlenecks? An additional focus is reflected by the question 'How do the different approaches work in developing countries?', which play an important role in the resource sector. Another aim was to include a broad spectrum of resources such as mining, forestry, fisheries and agriculture (the latter in line with forest plantations and aquaculture).

These aims have partly been realised. Let me start with the resource sectors and their products. This issue presents full papers and case studies about mining and metals (4), forestry and wooden products (1), fisheries and fish products (3), agriculture and agricultural products (2). Given the spatial limitations of one journal issue, we have achieved our aims in this respect.

The next point concerns the range of approaches involved. The reader may observe a major focus on analytical tools. Six papers deal with LCA, two with SFA, and only two papers focus on a procedural tool. The articles on analytical tools have a broad scope, which is a positive effect. Two of the six papers on LCA have a methodological focus, specifically linked to the mining and metals sector (Labuschagne & Brent and Gloria et al.).

Two articles support LCA of Type I eco-labelling (Coltro et al. and Mungkung et al.). One paper supports certification criteria by the Marine Stewardship Council (MSC) (Ellingsen & Aanondsen), and another one fisheries policy (Thrane). One of the two papers on SFA deals with a model for the aluminium household, aiming at application by the aluminium industry (Martchek), and one deals with the cadmium household, aiming at policy recommendations (Hawkins). Although LCA is dominant, SFA joins the scene, and a variety of applications of these tools in the field of natural resources is presented. The two papers focusing on procedural tools present Type III product declarations (or EPDs) for furniture, LCA-supported (Fet & Skaar), and benchmarking of farms (De Snoo).

Articles focusing on the certification of resource management, and on the concomitant labelling of resources, are missing. This is a true limitation of the scope of this issue. Due to its input-output character, it is difficult, if not impossible, for LCA to deal with one-time transitions, with the impacts of prohibitions (like no-logging in protected areas) and with local impacts such as biodiversity. The so-called hurdle criteria in certification and eco-labelling, i.e. the pass/fail requirements on management activities and environmental conditions, are precisely adapted to this type of information. The three papers on fisheries (Mungkung et al., Ellingsen & Aanondsen and Thrane) do discuss this issue.

Further, it was an explicit aim of both the conference and this Special Issue to investigate the effectiveness of different life-cycle approaches, and this aim has not been reached; there is no article which completely focuses on implementation. However, three papers deal with tool development in direct correspondence with stakeholders, or referring to tests in practical pilot studies (Fet & Skaar, Martchek and De Snoo).

Finally, we notice that the regional scope of the papers is diverse. Four papers focus on European countries, one on North America, one on a South American country, one on an Asian country, one on South Africa, and two have a global reach. Thus, three of ten papers stem from developing countries. Some of them discuss explicitly the barriers for life-cycle approaches in these countries, due to special requirements, markets, costs, price premiums and organisational aspects.

In summary, this Special Issue goes into a variety of natural resources, has a broad regional scope with a significant input from developing countries and investigates analytical tools such as LCA and SFA in various application contexts. In this sense, it is an important step forward, but is still limited in dealing with procedural tools, such as certification and eco-labelling, and misses sufficient awareness of the application in practice, which is a further, namely the next step.